

NON-PUBLIC?: N  
ACCESSION #: 8912270294  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Virgil C. Summer Nuclear Station PAGE: 1 OF 4

DOCKET NUMBER: 05000395

TITLE: Manual Reactor Trip Due to Pressurizer Safety Valve Failure  
EVENT DATE: 08/25/89 LER #: 89-015-02 REPORT DATE: 12/20/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: W.R. Higgins, Supervisor, Regulatory COMPLIANCE: (803)345-4042  
Compliance

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: AR COMPONENT: RV MANUFACTURER: C710  
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

At 1000 hours on August 25, 1989, the "A" pressurizer safety valve body inlet temperature increased to greater than 450 degrees F and a plant shutdown was initiated. Shortly after the load reduction was started, the "A" pressurizer safety valve opened at a system pressure of approximately 2260 psig. At 1003 hours, the acoustic leak monitor alarmed, the Reactor Coolant System (RCS) began to rapidly depressurize and at approximately 1004 hours the Shift Supervisor directed a manual reactor trip. The pressurizer safety valve reseated prior to reaching the Safety Injection setpoint of 1850 psig. All plant parameters recovered to their expected post trip values except RCS pressure which was controlled around 2000 psig to avoid lifting the safety valve again. The plant was taken to cold shutdown, the "A" pressurizer safety valve replaced, and the reactor was restarted at 0635 hours on September 1, 1989. Further investigation by the Licensee has shown that a loss of loop seal on the "A" pressurizer safety valve was the cause of the

valve's misoperation.

LER 89-011, dated June 27, 1989, documents a similar event involving the "C" pressurizer safety valve. The Licensee has determined that a loss of loop seal was a contributing factor in the event and will submit this finding in a supplemental report. The expected submission date of this report is January 3, 1990.

END OF ABSTRACT

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PLANT IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION:

Pressurizer Safety Valve - EIIS - None

IDENTIFICATION OF EVENT:

Pressurizer Safety Valve "A" body inlet temperature exceeded a preestablished limit, a controlled shutdown commenced, "A" safety valve lifted resulting in a rapid depressurization of RCS and a manual reactor trip was initiated.

EVENT DATE:

August 25, 1989

REPORT DATE: No later than September 24, 1989.

This report was initiated by Off-Normal Occurrence Report 89-082.

CONDITION PRIOR TO EVENT:

Mode 1 - Reactor Power 100%

DESCRIPTION OF EVENT:

Licensee Event Report 89-011 dated June 27, 1989, documents a manual reactor trip following the unseating of "C" pressurizer safety valve. One of the actions taken as the result of the event was the installation of thermocouples to facilitate the monitoring of the pressurizer safety valve body inlet temperature. A rapid increase in the valve body inlet

temperature is indicative of the loss of loop seal. A special instruction was issued detailing the monitoring of the temperature and the initiation of a shutdown should the valve body inlet temperature reach 450 degrees F. At 0945 hours on August 25, 1989, a temperature of 403 degrees F was indicated on "A" safety valve. This temperature was in an alert range which required Operations to continuously monitor the temperature. At approximately 1000 hours, the "Pressurizer Safety Valve Temperature Limit Exceeded" alarm annunciated and a normal shutdown was commenced at .5%/minute and later increased to 3%/minute. At 1003 hours, the acoustic leak monitor alarmed and the Reactor Coolant System (RCS) began to rapidly depressurize and at approximately 1004 hours, the Shift Supervisor directed a manual reactor trip be inserted. The RCS pressure was monitored by the operators and the lowest system pressure observed was 1950 psig. All plant parameters recovered to their expected post trip values except RCS pressure which was controlled at 2000 psig to avoid the possibility of lifting the safety valve again.

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#### CAUSE OF EVENT:

The Licensee has determined that a loss of loop seal on the "A" pressurizer safety valve caused the valve's misoperation. The valve was initially leaking, which caused the high loop seal temperature (403 degrees F at 0945 hours on August 25, 1989). As the loop seal temperature exceeded 450 degrees F, the leakage increased rapidly, leading to a loss of the loop seal. With the loop seal gone, the setpoint was dramatically reduced. When the "Pressurizer Safety Valve Temperature Limit Exceeded" alarm annunciated, shutdown was initiated causing the system pressure to increase. When the system pressure reached 2260 psig, the "A" pressurizer safety valve, which was set at the low end of the tolerance band, momentarily lifted.

#### ANALYSIS OF EVENT:

The safety significance of this event was moderate in that if the safety valve had not seated following the Reactor Trip, a Safety Injection would have been challenged.

#### IMMEDIATE CORRECTIVE ACTION:

Immediate corrective action was taken with the initiation of the manual Reactor Trip. The operators monitored RCS pressure to ensure that the pressurizer safety valve reseated and were prepared to initiate Safety Injection. Plant parameters were monitored and the plant was stabilized in Mode 3 at a reduced operating pressure of 2000 psig. The plant was

subsequently taken to Mode 5 for replacement of the safety valve.

ADDITIONAL CORRECTIVE ACTION:

The pressurizer safety valve body inlet temperature shutdown criterion remains at 390 degrees F, however at 350 degrees F action will be taken to develop a plan for plant shutdown taking into account, among other variables, the rate of change of temperature. SCE&G management and the Resident NRC Inspector will be notified when the safety valve temperature reaches 350 degrees F.

The event has been discussed with all Operations personnel. The discussion included the rapid response of the valve upon the loss of loop seal.

SCE&G intends to: 1) modify the pressurizer safety valves' internals for steam application, and 2) eliminate loop seal capability on the pressurizer safety valves. This modification is scheduled for the fifth refueling outage (currently scheduled to begin March 23, 1990) and is contingent upon receiving the required materials in time for implementation.

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PRIOR OCCURRENCES:

LER 89-011, June 27, 1989

ATTACHMENT 1 TO 8912270294 PAGE 1 OF 1

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Ollie S. Bradham  
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December 20, 1989

SCE&G

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: Virgil C. Summer Nuclear Station  
Docket No. 50/395  
Operating License No. NPF-12  
LER 89-015, Revision 2

Gentlemen:

As promulgated in Licensee Event Report No. 89-015 for the Virgil C. Summer Nuclear Station, attached is Revision 2 to Licensee Event Report No. 89-015. Specifically, this revision provides the cause of event for the August 25, 1989, incident and supplements the "Additional Corrective Action" section. Two typographical changes are also made in this revision. Specifically, the suffix "ed" was added to "alarm" in the "Abstract" section and the date of LER 89-011 was corrected from June 7, 1989, to June 27, 1989, in the "Prior Occurrences" section. This report is submitted pursuant to the requirements of 10CFR50.73 (a)(2)(iv).

Should there be any questions, please call us at your convenience.

Very truly yours,

O. S. Bradham

EWR/OSB:lbs  
Attachment

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